Land and Water Education Resources for Northeast Missouri

Activity guides, programs, interactive displays, and on-line resources

July 2015

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Our Missouri WATERS

Land and Water Education Resources for Northeast Missouri

Welcome

Welcome! This booklet is intended to be a resource for educators in northeast Missouri, with the simple goal of letting K-12 educators in this region be aware of different curriculum, programs, items available for loan, and displays that are available in your region that you may find useful in teaching your students about land and water resources. In November of 2014, I attended the Mississippi River Watershed Education Symposium at the National Great Rivers Research and Education Center at Lewis and Clark Community College in Godfrey, IL. The conference brought together educators from several states, including Minnesota, Ohio, Maryland, Illinois, and Missouri. There was a wealth of information shared about activities for place-based learning, STEM disciplines, and implementation of the Next Generation Science Standards. All of the materials shared had a common theme–their connection to land and water resources in the Mississippi River Watershed. Where ever your school is in Missouri, your students share this common theme—they live and walk on land that drains water eventually to the Mississippi River. When I returned from the conference, I wanted to compile the resources that I had learned about and my knowledge about resources in our region into an easy to reference booklet. This is a living document. If you know of other resources that should be included in this booklet, please let me know. Lastly, thank you all for your work educating our youth. In addition to us sharing a connection of living in the Mississippi River Watershed, our students and communities within our watershed share another common theme—a dependence on the land and water resources in our area to provide a healthy and sustainable future. My favorite definition of sustainability is "making the best future possible". Thank you all for your daily efforts to do just this! Please don't hesitate to contact me with any comments, questions, or requests.

Sincerely,

Mary Culler

Northeast Region Watershed Coordinator

Missouri Department of Natural Resources

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Contents

Project WET (Water Education for Teachers)

Description: Project WET (Water Education for Teachers) are activities about water, including its physical and chemical characteristics, the biology that lives in water, its role in Earth's processes, and management of water supply and quality. Project WET's award-winning Curriculum and Activity Guide 2.0 has 64 activities that are supplementary and interdisciplinary. There are activities for grades K-12, and some activities have pre-K options. Project WET activities teach students how to think, not what to think. This teaching guide is filled with activities and ideas to get your students up out of their seats and outside for hands on learning about science and other core subjects. This guide is recommended by the National Science Teachers Association (NSTA).

Activities in the guide have been matched to the Common Core National Standards for both Math and English/Language Arts and the Missouri Grade Level Expectations and Course Level Expectations for Science. Also, we are currently working to have the Next Generation Science Standards matched to Project WET activities.

Grades: K-12, some pre-K options

Resources:

Project WET's Curriculum and Activity Guide 2.0

Missouri Project WET http://projectwet.missouristate.edu/

Project WET Foundation http://www.projectwet.org/

Project WET portal – access to color or black/white activity sheets, activities, reading corner, library, store, and blog. http://portal.projectwet.org/, must complete Project WET workshop to obtain login access

How to obtain this resource: To receive a Project WET activity guide and membership to the Project WET web portal, educators must attend a 6 hour workshop. Trained Project WET workshop facilitators are available throughout the state and Project WET workshops are held annually around the state. Workshop fee is currently $25.00/person.

Contact Information – to receive more information or find out about attending a workshop

Erica Cox
State Project WET Coordinator
Missouri State University
Department of Biology
901 S. National Ave.
Springfield, MO 65897
EricaCox@MissouriState.edu
417-836-4337

Mary Culler
Project WET facilitator
Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
Mary.Culler@dnr.mo.gov

Our Mississippi

Description:

Our Mississippi is an instructional program for educators of students primarily in 5th and 6th grades. Much of the information and many of the activities have extension information for both lower and upper grade levels. This program was a U.S. Army Corps of Engineers (Corps) initiative, but will blossom into a partnership between federal, state, local and non-profit agencies to further expand educational opportunities throughout the upper Mississippi River area.

The primary goal of the *Our Mississippi* curriculum is to provide educators a mix of classroom, self-directed, and collaborative lessons and activities about the Upper Mississippi River that meet a wide range of national learning standards. This multi-disciplinary approach, weaves science, technology, and math with social sciences, language, and arts collaboratively to address complex, real-life resource management issues and multiple uses of the river. The Mississippi River is wrought with rich natural and cultural resources and this guide puts much of it right at your fingertips.

Grades: 5th and 6th, with activities and extensions for lower and upper grades

Resources:

Our Mississippi Educational Activities about the Upper Mississippi River

http://www.ourmississippi.org/, Education & Outreach Activities

How to use this resource:

To receive an *Our Mississippi* activities guide, educators should attend a workshop. Trained *Our Mississippi* workshop facilitators host workshops throughout the year. Workshop and guide are free.

Contact Information:

Erin Hilligoss-Volkmann
erin.a.hilligoss-volkmann@usace.army.mil
(618) 462-6979
(636) 899-0086
Cell(314) 541-4569.

Angela Smith
Angela.N.Smith@usace.army.mil
(618) 462-6979

Discover Nature Schools

Description: The Discover Nature Schools program provides teacher training, instructional units, and funding for equipment and field trips that provide students with hands-on experiences in nature. Each full color instructional unit meets Missouri grade-level expectations and includes a teacher guide. In addition to the teacher guide of activities, each student receives their own student book.

Discover Nature Schools curriculum is FREE to Missouri teachers.

There are five instructional units:

- *Nature Unfolds* instructional unit helps K-2 students learn about life cycles, basic needs of plants and animals, and seasons and weather.
- *Nature Unleashed* instructional unit for grades 3-5 helps elementary students learn about Missouri's ponds, forests and prairies.
- *Nature Unhooked* instructional unit for grades 6-8 helps middle-school students learn about the role of water in an ecosystem.
- *Nature Unbound* instructional unit for grades 9-12 helps high school students understand the impact of ecology on Missouri and the world.
- *Nature Revealed* is for pre-K; this unit does not include student books or funding for field trips or supplies.

Grades: pre-K – 12. There is a curriculum on Missouri's aquatic ecosystems specifically for grades 6-8.

Resources: Find out more about Discover Nature Schools at http://mdc.mo.gov/education/discover-nature-schools.

How to obtain this resource: Contact your local Missouri Department of Conservation education consultant.

Karen Armstrong
Conservation Education Consultant
Missouri Department of Conservation
Kirksville Office
3500 S. Baltimore, Kirksville, MO 63501
660-785-2420; Karen.Armstrong@mdc.mo.gov

Kathi Moore
Conservation Education Consultant
Missouri Department of Conservation
Hannibal Office
8965 Hwy 36 Ste 1, Hannibal, MO 63401
573-248-2530 ext. 6378; Kathi.Moore@mdc.mo.gov

Kim Cole
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Missouri Department of Conservation
Columbia Office
3500 East Gans Road, Columbia, MO 65201
573-815-7900; Kim.Cole@mdc.mo.gov

Adam Brandsgaard
Conservation Education Consultant
Missouri Department of Conservation
Chillicothe Office
15368 LIV 2386, Chillicothe, MO 64601
660-646-3140; Adam.Brandsgaard@mdc.mo.gov

Creek Freaks

Description: Creek Freaks is a water based education program that focuses on upper elementary and middle school age ranges. Creek Freaks allows youth to become experts on their local streams. Our curriculum has hands-on activities that help introduce students to concepts such as watersheds, water quality, riparian zones, and erosion. Creek Freaks also explores stream monitoring, which introduces students to potential careers in the field of natural resources. Youth have the opportunity to conduct biological, chemical, and physical stream monitoring, and share their data on www.creekfreaks.net. This program can be incorporated into formal or non-formal education. Lessons can be incorporated into existing programming or combined to create new programming! Creek Freaks is a project of the Izaak Walton League of America. To see a video that gives an overview of Creek Freaks, visit https://www.youtube.com/watch?v=pkIlxMboE7s&list=UU516SirMb_kpK9fXoXKMUAA&index=42 .

Grades: 4th-8th

Resources:
The Creek Freaks website www.creekfreaks.net has a wealth of information to begin your Creek Freaks journey. Students can engage with an interactive map of the US and view water quality reports from across the country. Leaders can sign up and create their own program pages to upload stream monitoring data, photos, and videos to share with their community and other Creek Freaks programs nationwide.

Visit the Creek Freaks library (www.creekfreaks.net/library) to access many resources and tools.
The Library contains the Creek Freaks Curriculum (*Holding onto the Green Zone*), our Addendum to the curriculum which includes tips and tricks for the lessons, stream monitoring instructions, data, forms, material lists, and background information. The leader guide for *Holding onto the Green Zone* can be accessed in the Program Leaders Toolbox (www.creekfreaks.net/toolbox)

Learn fun facts about stream monitoring, rivers and streams, macroinvertebrates, and water quality by following Creek Freaks on Social Media. We post regularly on Facebook and Twitter with our Macroinvertebrate Mondays and Creek Freaky Fridays!
Twitter: https://twitter.com/CreekFreaks1
Facebook: https://www.facebook.com/creekfreaks

How to obtain this resource:
To get a taste for the Creek Freaks activities please watch a few of our training videos, available at http://www.creekfreaks.net/training.

To obtain the leader activity guide, go to the link http://www.creekfreaks.net/sites/default/files/attachments/LeaderGuide102008-2.pdf

To obtain the action guides for students, go to the link
http://www.creekfreaks.net/node/5

Contact Information:
Leah Miller
707 Conservation Lane, Gaithersburg, MD 20878, 301-548-0150 x 219, sos@iwla.org

Soil to Spoon

Description: National Association of Conservation Districts (NACD) has created education materials to teach youth and adults the importance of soil in the food they eat every day. Available materials include student booklets, poster, bookmark, placemat/activity sheet, CD with PowerPoints for youth and adults and more. Materials emphasize how our food depends on soil.

Grades: K-12th

Resources:
There are four student booklets available (Grade K-1, 2-3, 4-5, and 6 and up). There is also a bookmark, activity sheet/placemat, poster, educator guide, clip art and images.

Curriculum and Activity Guides

How to obtain this resource:

Visit http://www.nacdnet.org/education/resources/soil-to-spoon

Contact Information:

Susan Schultz
(317) 326-2952
968 East 600 North
Greenfield, IN 46140

Streets to Streams: Youth Investigations into Water Quality

Description: The goal of this curriculum is to educate students about the role of surface water in the environment and to move them to action to protect the quality of area waters. It is designed to provide background for groups undertaking community action to protect water resources, such as a storm drain stenciling project. These materials help to reinforce concepts taught in many elementary and middle school curricula including freshwater ecology, human impacts on streams, types of environmental pollutants and the potential impacts of contaminants on aquatic ecosystems. Units within the book include: water basics, watersheds, stream ecology, contaminant characteristics, toxicity testing, personal actions, and community involvement.

Grades: 5-9

Resources: *Streets to Streams: Youth Investigations into Water Quality* book

How to obtain this resource:

Contact the MU-Extension Water Quality Office, 205 Agricultural Engineering, Columbia, MO 65211

Contact Information:

Bob Broz
MU-Extension
573-882-0085
brozr@missouri.edu

Dan Downing
MU-Extension
(573) 884-8438
downingd@missouri.edu

Groundwater Restoration

Description: *Groundwater Restoration* includes a teacher guide, student worksheets, and a webinar. This guide is a new, exciting way for students to learn about groundwater while developing their engineering skills. This three part activity is designed for 5th-8th grade classrooms and is aligned to the Next Generation Science Standards.

Grades: 5-8

How to obtain this resource: Find out more information at http://www.groundwater.org/kids/getinvolved/restoration.html

Contact Information:

The Groundwater Foundation
1-800-858-4844
402-434-2740
Fax: 402-434-2742
E-mail info@groundwater.org

Missouri Stream Team Volunteer Water Quality Monitoring Program

Description: The Missouri Stream Team Program offers Introductory, Level 1, Level 2, and Level 3 workshops that teach citizen volunteers about stream ecosystems and how to conduct water quality monitoring. If volunteers choose to become a Stream Team and adopt a stream site to monitor, volunteers are provided with free training and may qualify for water quality monitoring equipment. In addition to monitoring water quality at a local stream, Missouri Stream Teams can do other activities that they are interested in, such as litter control, streamside tree planting, and storm drain stenciling. Stream Team can help you plan a project or match you with another group's effort. Individuals of any age, families, groups, or organizations of any type can form a Stream Team. There are over 5,000 Stream Teams in Missouri.

Grades: youth to adult

Resources:

Missouri Stream Team Middle School Activity Guide contains several lessons on Missouri's streams and the watersheds that shape them. Available at http://mostreamteam.org/activity_guide/contents.htm

Kids Corner coloring pages are available at http://www.mostreamteam.org/kidscorner.asp

How to obtain this resource: Contact the Missouri Stream Team Coordination Biologist for Northern Missouri or a Volunteer Water Quality Monitoring Coordinator.

Contact Information:

Amy Meier
Stream Team Coordination Biologist
Missouri Department of Conservation
(573) 522-4115, Ext. 3166
Amy.Meier@mdc.mo.gov

Susan Higgins
Volunteer Water Quality Monitoring Coordinator
Missouri Department of Natural Resources
Phone: (573) 526-1002
Susan.Higgins@dnr.mo.gov

Lakes of Missouri Volunteer Program

Description: The goals of the Lakes of Missouri Volunteer Program are to determine the current water quality of Missouri's lakes, monitor for changes in water quality over time, and educate the public about lake ecology and water quality issues. Volunteers are trained to collect data to measure water clarity, phosphorus, nitrogen, chlorophyll, and suspended sediments in lakes. Volunteers are asked to monitor at 3 week intervals from late spring to early fall at an adopted lake site.

Grades: youth (if parents or adult supervisor are present), high school to adult

Resources: Lakes of Missouri Volunteer Program website at www.lmvp.org

How to obtain this resource: Contact the Lakes of Missouri Volunteer Monitoring Program Coordinator .

Contact Information

Tony Thorpe
The Lakes of Missouri Volunteer Program
302 ABNR Building
University of Missouri
Columbia, MO 65211
800-895-2260
tony@lmvp.org

Dan Obrecht
The Lakes of Missouri Volunteer Program
302 ABNR Building
University of Missouri
Columbia, MO 65211
800-895-2260
obrechtd@missouri.edu

Discover Nature Fishing

Description:
Discover Nature – Fishing (DN-F) is a program designed to teach youths and families about fishing in Missouri. There are three program areas that are addressed by DN-F. The first program is a four-lesson curriculum for beginners taught by MDC volunteer instructors, teachers, camp staff, youth group leaders and other partners. Attendees learn the basics of fishing and each lesson builds on skills learned in the previous lessons. The second program is for individuals who want more information on specific fishing topics. These classes are referred to as extension classes. Extension classes focus on species-specific, method-specific, and location-specific fishing, how to cook and clean your fish, equipment maintenance, etc. Classes are currently being offered for beginners but more advanced classes are coming soon. The third program is in support of youth fishing clubs and high school fishing teams. MDC plans to host regional high school fishing tournaments in the fall. Grants are available through MDC to assist schools with starting fishing clubs or teams.

Grades: Youth and families

Resources: Find out more about Discover Nature – Fishing at: http://mdc.mo.gov/discover-nature/discover-nature-programs/discover-nature-fishing

How to obtain this resource: Contact the Missouri Department of Conservation office in Hannibal.

Contact Information

Chelsea Jeffries
Missouri Department of Conservation
Hannibal Office
8965 Hwy 36 Ste 1
Hannibal, MO 63401
573-248-2530
chelsea.jeffries@mdc.mo.gov

Don Rahm
Missouri Department of Conservation
Columbia Office
3500 East Gans Rd.
Columbia, MO 65201
573-815-7900, ext. 3968
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Enviroscape Model

Description: This model shows part of a watershed and the various point and non-point sources of pollution in a typical watershed, such as wastewater treatment plants, factories, urban, residential, and agricultural areas. Cocoa mix and other colored drink mixes are used to simulate pollutants, and then water can be sprayed over various parts of the model to show how pollutants are carried downstream during and after a precipitation event. The model also includes "Best Management Practices" that can be used to illustrate practices that reduce the run-off of pollutants in a watershed.

Grades: any

Resources: More information about this Enviroscape model can be found at http://www.enviroscapes.com/nonpoint-source.html

How to obtain this resource: Contact the Missouri Department of Natural Resources Northeast Regional Office in Macon. You will need to fill out a loan agreement form. No deposit required. Or contact the Missouri Department of Conservation office in Kirksville.

Enviroscape Model

Items available for loan

Contact Information:

Mary Culler
Northeast Region Watershed Coordinator
Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
Mary.Culler@dnr.mo.gov
Mary.Culler@dnr.mo.gov

Karen Armstrong
Conservation Education Consultant
Missouri Department of Conservation
3500 S. Baltimore
Kirksville, MO 63501
660-785-2420
Karen.Armstrong@mdc.mo.gov

Discover Nature Trunks

Description: There are trunks available for mammals, wild turkey, white tailed deer, beaver, black bear, insects, amphibians and reptiles, raptors, bats, ants, butterflies, forestry, birds, prairies, ponds and rivers, caves, wetlands, wildflowers, endangered species, camping, biogeography, and Lewis and Clark. Each trunk is filled with a variety of items to help implement your Discover Nature Schools unit.

Grades: childhood through secondary level

Resources: Each trunk has hands-on items to teach about these topics.

How to obtain this resource: Contact the Missouri Department of Conservation office in Kirksville, Hannibal, Columbia, or Chillicothe.

Karen Armstrong
Conservation Education Consultant
Missouri Department of Conservation
Kirksville Office
3500 S. Baltimore, Kirksville, MO 63501
660-785-2420
Karen.Armstrong@mdc.mo.gov

Kim Cole
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Missouri Department of Conservation
Columbia Office
3500 East Gans Road, Columbia, MO 65201
573-815-7900
Kim.Cole@mdc.mo.gov

Kathi Moore
Conservation Education Consultant
Missouri Department of Conservation
Hannibal Office
8965 Hwy 36 Ste 1, Hannibal, MO 63401
573-248-2530 ext. 6378;
Kathi.Moore@mdc.mo.gov

Adam Brandsgaard
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Missouri Department of Conservation
Chillicothe Office
15368 LIV 2386, Chillicothe, MO 64601
660-646-3140
Adam.Brandsgaard@mdc.mo.gov

Items available for loan

Fishing Poles

Description: Fishing rods and reels (spincast) are available for teaching youth and adults how to fish. Tackle boxes with bobbers, hooks, and sinkers are also available. Bait is not provided.

Grades: K-12

How to obtain this resource: Contact the Missouri Department of Conservation office in either Kirksville or Hannibal.

Contact Information:

Missouri Department of Conservation
Kirksville Office
3500 S. Baltimore
Kirksville, MO 63501
660-785-2424

Missouri Department of Conservation
Hannibal Office
8965 Hwy 36 Ste 1
Hannibal, MO 63401
573-248-2530

Items available for loan

Rain Simulation Table

Description: This demonstration table shows how different land management types (for example tall pasture, short pasture, tilled row crop, no till, no till with cover crop) affect the amount of rain that soaks into the ground during a one inch rainfall. During the rain simulation, water that soaks into the ground for each land management type is collected in a container that is placed beneath the soil to show the amount of water that soaks in (infiltrates) the soil. Water that does not soak in is allowed to runoff and this water is collected in a separate container for each soil type. The demonstration shows how pasture height, tillage, and management of crop residue or cover crops affects the volume of water that infiltrates and runs off for each management type, and also the amount of sediment that runs off for each management type. This demonstration does take a considerable amount of time to set up so it is desirable that the presentation be for a fairly large group.

Grades: youth to adult

Resources: To see a You-Tube video of this model, visit https://www.youtube.com/watch?v=AZPkeg9s4DI

How to obtain this resource: Contact the University of Missouri Bradford Research Center or your local Natural Resource Conservation Service (NRCS) office for a guest presentation (subject to availability and scheduling).

Rain Simulation Model

Contact Information:
University of Missouri-Bradford Research Center
4968 Rangeline Road
Columbia, MO 65201-8973
573-884-7945
Or contact your local USDA NRCS office.

Stream Table

Description: This table illustrates a flowing stream. The table can be used to discuss the hydrologic cycle, stream ecosystems, stream shape and gradient, erosion and deposition of sediment, effects of stream channelization, sources of pollution in a watershed, and management practices to reduce erosion and improve water quality and aquatic habitat.

Grades: youth to adult

How to obtain this resource: Contact the Missouri Department of Natural Resources Northeast Regional Office in Macon, the Division of State Parks Regional Office in Brookfield, or the Missouri Department of Conservation offices in Chillicothe, Kirksville, Hannibal, or Columbia for a guest presentation (subject to availability and scheduling).

Stream Table

Contact Information:

Mary Culler
Northeast Region Watershed Coordinator
Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
Mary.Culler@dnr.mo.gov

Lee Wilbeck
Division of State Parks
Missouri Department of Natural Resources
600 West Lockling
Brookfield, MO 64628
660-258-7496
Lee.Wilbeck@dnr.mo.gov

Or contact your local MDC office at http://mdc.mo.gov/

Groundwater Model

Description: This model simulates the effects of pollution to groundwater and underground resources. The effects of pollution to different underground zones, layers, etc. are illustrated through injection of "pollution" (colored water) into the model. Students are able to observe how pollution moves throughout these different features and the importance of protecting our natural resources, even those unseen, from pollution.

Grades: any

How to obtain this resource: Contact the Missouri Department of Natural Resources Northeast Regional Office in Macon for a guest presentation (subject to availability and scheduling).

Groundwater Model

Contact Information

Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
NERO@dnr.mo.gov

Enviroscape Model - Hazardous Waste

Description: This Enviroscape Hazardous Waste model can be used to help students learn the difference between hazardous materials and wastes, where hazardous waste comes from, and how the environment can be affected by hazardous waste contamination. A simulated community including a school, landfill, water treatment plant, and other area features can be found on the model. "Hazardous waste" in the form of cocoa powder and colored drink mixes is applied to the model, and "rain" (water sprayed from a bottle) shows how and where the waste can travel in the environment. Other items of discussion can include the prevention and cleanup of hazardous waste contamination, as well as roles of state and local agencies in these efforts.

Grades: any

How to obtain this resource: Contact the Missouri Department of Natural Resources Northeast Regional Office in Macon for a guest presentation (subject to availability and scheduling).

Enviroscape Model - Hazardous Waste

Contact Information

Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
NERO@dnr.mo.gov

Enviroscape Model - Landfill

Description: This Enviroscape Landfill model can be used to simulate an active modern landfill and an old style dump. The model also consists of a groundwater portion showing potential pollution to an aquifer. "Trash" is presoaked with "leachate" (food coloring) to demonstrate how leachate from the landfill travels when it "rains" (water is sprayed from water bottles). The process of leachate collection, storage, and treatment can also be discussed. Students learn the importance of using properly constructed landfills to store waste and prevent pollution to the environment, as well as the role recycling can play to reduce the amount of waste sent to landfills.

Grades: any

How to obtain this resource: Contact the Missouri Department of Natural Resources Northeast Regional Office in Macon for a guest presentation (subject to availability and scheduling).

Enviroscape Model - Landfill

Contact Information
Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
NERO@dnr.mo.gov

Enviroscape Model - Watershed

Description: The model shows part of a watershed and the various point and non-point sources of pollution in a typical watershed, such as wastewater treatment plants, factories, urban, residential, and agricultural areas. Cocoa mix and other colored drink mixes are used to simulate pollutants, and then water can be sprayed over various parts of the model to show how pollutants are carried downstream during and after a precipitation event. The model also includes "Best Management Practices" that can be used to illustrate practices that reduce the runoff of pollutants in a watershed.

Grades: any

Resources: More information about this Enviroscape model can be found at http://www.enviroscapes.com/nonpoint-source.html

How to obtain this resource: Contact the Missouri Department of Natural Resources Northeast Regional Office in Macon for a guest presentation (subject to availability and scheduling).

Enviroscape Model - Watershed

Contact Information

Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
NERO@dnr.mo.gov

The Underground World - Earth Tunnel

Description: This tunnel simulates what can be found underground, such as plants, animals, and insects. Students crawl through the tunnel to witness examples of these plants and creatures. This allows them to imagine what it is like to burrow into the ground beneath their feet, learn about the creatures that reside there, and understand the importance of protecting our natural resources since the effects of pollution can be far-reaching and unseen at times.

Grades: Pre-K through 4th grade

How to obtain this resource: Contact the Missouri Department of Natural Resources Northeast Regional Office in Macon for a guest presentation (subject to availability and scheduling). Due to the tunnel's size and time and effort required to load and haul it, preference in scheduling will be given to larger groups or events.

Earth Tunnel

Contact Information

Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
NERO@dnr.mo.gov

Macro-Invertebrate Specimens

Description: A variety of macro-invertebrate specimens (aquatic insects collection, dragonfly life cycle, and aquatic insects panels (Carolina™ POM 2688/1870)) shows students the range of macro-invertebrates that may be encountered in nearby streams, ponds, waterways, etc. and how those macro-invertebrates can be used in water quality monitoring. Students learn how to identify and classify species of macro-invertebrates that are tolerant and sensitive to pollution, which is useful in indicating the health of a body of water.

Grades: any

How to obtain this resource: Contact the Missouri Department of Natural Resources North-east Regional Office in Macon for a guest presentation (subject to availability and scheduling).

Macro-invertebrate Specimens

Contact Information

Missouri Department of Natural Resources
1709 Prospect Drive, Macon, MO 63552
660-385-8000
NERO@dnr.mo.gov

Soil Health Education Resources

Check out this **Soil Health Nuggets** colorful poster at http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1101660.pdf , appropriate for upper grade levels

Two seasons of **short videos** that **Explore the Science of Soil Health** for all age groups including adults
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=stelprdb1245890

Check out the **Soil is Alive** activity book for elementary age students at http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_036023.pdf

Check out this **Soil Food Web poster** http://www.nrcs.usda.gov/Internet/FSE_MEDIA/stelprdb1049272.gif

The **Soil Biology Primer** http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/biology/ is an introduction to **the living component of soil** and how it contributes to agricultural productivity and air and water quality. The Primer includes chapters describing the soil food web and its relationship to soil health and chapters about soil bacteria, fungi, protozoa, nematodes, arthropods, and earthworms.

Check out these **Healthy Soils colorful fact sheets** http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=stelprdb1193043

Check out these **Healthy Soil Graphics** http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=stelprdb1143204
And http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=stelprdb1143889

Visit the **Soil Health Awareness website** for a wealth of Soil Health information http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/

Check out these **soil posters, student booklets, and education guide/CD**, etc. http://www.nacdnet.org/education/resources/soils/pdfs/product_flyer.pdf -

Check out the **Soil to Spoon** Project. http://www.nacdnet.org/education/resources/soil-to-spoon Materials **emphasize how our food depends on soil**. Includes educator guide, student booklets, placemats, bookmark, posters, clip art and images.

Check out the K-12 Soil Science Teacher Resources through the Soil Science Society of America at http://www.soils4teachers.org/ and activities for K-12 at http://www.soils4kids.org/

Groundwater Resources

The Groundwater Foundation's Kids' Corner website http://www.groundwater.org/kids/ has a wealth of information including hands-on activities, games and puzzles, models, educator guides, and ways to get involved.

Also, this website, http://www.groundwater.org/kids/events.html contains guides on how to organize and host a water festival, camp, and guides to festival activities. The Groundwater Foundation has the following guides:

- Making Waves: How to Put on a Water Festival
- Making More Waves: Ideas from Across the U.S. and Canada for Organizing Your Festival
- Making a Bigger Splash: A Collection of Water Education and Festival Activities
- Making Ripples: How to Organize a School Water Festival
- Making Discoveries: Groundwater Activities for the Classroom and Community
- Jump Into It: How to Organize a Groundwater Education Camp

Contact Information:

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Missouri Envirothon Competition

Description: The Envirothon is a problem-solving, natural resource education program for high school students. In the field, teams of students are challenged to hone critical thinking skills and work as a team. They answer questions and conduct hands-on investigation of environmental issues in five categories—Soils/Land Use, Aquatic Ecology, Forestry, Wildlife, and Current Environmental Issues. In addition to a written test, the teams also present an oral presentation solving a specific natural resource issue.

Reference materials for students and teachers are available through local soil and water conservation districts. Envirothon can also be used as a curriculum guide in conjunction with classroom study. Conservation districts with cooperating agency educators, community, and interest groups conduct regional competitions. The three top teams of the regional competitions advance to the state competition held in early May. The winning team represents Missouri at the North American Envirothon.

Grades: High School

Resources: Missouri Envirothon webpage at http://www.moenvirothon.org/

How to obtain this resource: Contact your Regional Coordinator. The coordinator map is available at http://www.moenvirothon.org/envcontacts.htm

Contact Information

Northwest Missouri
Heather Keith
Regional Coordinator
660-359-2006 ext 101
www.swcd.mo.gov/grundy/Envirothon.htm

Northeast Missouri
Lena Sharp /Andrea McKeown
Regional Coordinator
660-327-4117 ext. 3 /660-263-5702 ext. 3

Central Missouri
Bruce Longan
573-796-2010 ext. 3
www.swcd.mo.gov/moniteau/CentralRegionEnvirothonLinks.htm

Computer based learning

The Missouri Watershed Information (MoWIN) Network Web-Based Water Quality portal—a cd with activities for grades 4-8. Contact Bob Broz at 573-882-0085 or brozr@missouri.edu

Splash! - An interactive computer game that delivers information on non-point source pollution in a fast-paced and entertaining format. Appealing for audiences of all ages, it teaches fundamental concepts about non-point source pollution prevention measures in a farm, city, and neighborhood setting. Point and click screens that move and have sound help players learn how day-to-day decisions can affect the water quality of lakes and streams. From the Conservation Technology Information Center, 765-494-9555, ctic@ctic.org.

The Living Landscape - An interactive computer game that takes learners of all ages through various best management and conservation practices to turn a rundown farm and landscape into an environmental showplace! Point and click on various areas of the farm to answer related multiple choice questions. With each correct answer the farm scape changes to show the improvement made (complete with sound effects!). Once you make it through the set of questions correctly, the farm is set in motion with animation. From the Conservation Technology Information Center, 765-494-9555, ctic@ctic.org.

Check out ***Model My Watershed*** at http://wikiwatershed.org/model/ . This is an innovative and intuitive web-based hydrologic model using real GIS data to show how land use impacts local hydrology. It allows users to change local conditions to see how best management practices (BMPs) decrease runoff. With the Simple Water Balance Simulator, students learn how changes in the amount of rainfall, the surfaces on which the rain falls, and the texture of the soil change where the water goes.

See the video and lessons of the O.A.R. Northwest 2014 Mississippi River Adventure. Follow the O.A.R. Northwest team as they rowed from Lake Itasca, MN to the Gulf of Mexico, and learn about the Mississippi River along the way. http://oarnorthwest.com/expeditions/adventure-mississippi-river/

A few other quick ideas for classroom activities

Host a collection for used shoes for the Shoeman Water Project to help fund clean drinking water in developing countries. Find out more at www.shoemanwater.org

Have a Rain Barrel Design Contest. For more information about rain barrels, and how to make one, visit http://watershedcommittee.org/docs/rain-barrell-brochure-rev1.pdf

Have your students write their watershed address – what streams would a drop of water flow through from their home address to the Gulf of Mexico?

Have your students conduct a community service project, such as cleaning up trash on a local road, and document it through video or poster.

Check out water education posters from the U.S. Geological Survey at http://water.usgs.gov/outreach/OutReach.html. There are posters about watersheds, hazardous waste, wetlands, water use, wastewater, groundwater, water quality, navigation, and coastal hazards. On the back side of each poster, there are related activity suggestions.

Additional On-line resources:

The Water Rocks! website http://www.waterrocks.org/ provided by Iowa State University is an awesome website that has songs, fun videos and corresponding learning activities for grades K through 12, and a great deal of information. Check it out!

Missouri Department of Natural Resources education website http://dnr.mo.gov/education/

MDC Conservation Education Materials Request Form
http://mdc.mo.gov/sites/default/files/resources/2010/08/materialrequestform.pdf

Missouri Environmental Education Association Professional Development website http://www.meea.org/professionaldevelopment.shtml

EPA's Enivironmental Education website http://www2.epa.gov/education

The Water Sourcebook Series - 324 activities for grades K-12, drinking water, wastewater treatment, surface water resources, ground water, wetlands http://water.epa.gov/learn/kids/drinkingwater/wsb_index.cfm

American Water Education Toolkits http://www.amwater125.com/our-commitment/education-